

What is claimed is:

- 1           1.     A storage device comprising:  
2                 a probe having a tip, the tip comprising a first portion and a second portion;  
3     and  
4                 a storage medium having a surface,  
5                 wherein the tip of the probe is adapted to form a dent in the storage medium,  
6                 wherein the second portion of the tip is electrically contacted to the surface of  
7     the storage medium in response to the first portion being engaged in the dent, and  
8                 wherein the second portion of the tip is spaced apart from the surface of the  
9     storage medium in response to the first portion being engaged on the surface of the storage  
10    medium and not engaged in the dent.
- 1           2.     The storage device of claim 1, wherein the first portion is formed of an  
2     electrically insulating material, and the second portion is formed of an electrically conductive  
3     material.
- 1           3.     The storage device of claim 2, wherein the storage medium has an electrically  
2     conductive layer adjacent the surface of the storage medium, the electrically conductive layer  
3     to electrically communicate with the probe in response to the second portion of the tip being  
4     electrically contacted to the surface.
- 1           4.     The storage device of claim 3, further comprising an electrical conductor,  
2     wherein the electrically conductive layer is positioned between the electrical conductor and  
3     the surface of the storage medium,  
4                 wherein at least one of a voltage signal and a current signal is induced in the  
5     electrical conductor in response to electrical contact of the second portion of the tip with the  
6     surface of the storage medium.
- 1           5.     The storage device of claim 3, wherein the electrically conductive layer is  
2     formed of a material including polymer doped with electrically conductive elements.

1           6.       The storage device of claim 1, wherein the probe has a cantilever, the tip  
2 protruding from the cantilever, and wherein the cantilever is formed of an electrically  
3 conductive material,  
4               the cantilever adapted to provide at least one of a voltage and current to the  
5 second portion of the tip.

1           7.       The storage device of claim 1, further comprising a second probe having a tip  
2 adapted to form a second dent in the storage medium, the tip of the second probe having a  
3 first electrically insulating portion and a second electrically conductive portion,  
4               wherein the second electrically conductive portion electrically contacts the  
5 surface of the storage medium in response to the first electrically insulating portion of the tip  
6 of the second probe being engaged in the second dent, and  
7               wherein the second electrically conductive portion of the tip of the second  
8 probe is spaced apart and electrically isolated from the surface of the storage medium in  
9 response to the first electrically insulating portion of the tip of the second probe not being  
10 engaged in the second dent.

1           8.       The storage device of claim 1, further comprising a sensor device to detect at  
2 least one of a predetermined voltage and a predetermined current in response to electrical  
3 contact of the second portion of the tip with the surface of the storage medium.

1           9.       The storage device of claim 1, further comprising storage cells formed in the  
2 storage medium, wherein the storage medium and the probe are moveable with respect to  
3 each other to enable the probe to write to and read from the storage cells.

1           10.      The storage device of claim 1, wherein the probe comprises a nanotechnology  
2 probe.

1           11.      The storage device of claim 1, wherein the tip of the probe is adapted to form  
2 the dent in the storage medium during a write operation, and  
3               wherein the probe is adapted to detect the dent during a read operation.

1           12.    A system comprising:  
2                   a processor; and  
3                   a storage device comprising:  
4                       a probe having a tip; and  
5                       a storage medium having storage cells, the tip of the probe adapted to  
6 program the storage cells by forming a dent in a first storage cell and not forming a dent in a  
7 second storage cell,  
8                       the tip having an electrically conductive portion that is electrically  
9 contacted to a surface of the storage medium in response to the tip of the probe being  
10 engaged in the dent of the first storage cell, and  
11                       the electrically conductive portion of the tip of the probe being spaced  
12 apart from the surface of the storage medium in response to the tip not being engaged in a  
13 dent in the second storage cell.

1           13.    The system of claim 12, wherein the probe has a cantilever, and the  
2 electrically conductive portion comprises a base portion that is attached to the cantilever, the  
3 probe further having an electrically insulating portion that protrudes from the base portion,  
4                       wherein the electrically insulating portion is adapted to engage the surface of  
5 the storage medium.

1           14.    The system of claim 13, wherein the electrically insulating portion of the tip is  
2 provided into the dent of the first storage cell in response to the tip being positioned at the  
3 first storage cell.

1           15.    The system of claim 12, wherein the storage device further comprises a sensor  
2 device to detect at least one of a voltage signal and a current signal in response to the  
3 electrically conductive portion of the base being electrically contacted to the surface of the  
4 storage medium.

1           16.    The system of claim 15, wherein the sensor device does not detect the at least  
2 one of the voltage signal and the current signal in response to the electrically conductive  
3 portion of the tip being spaced apart from the surface of the storage medium.

1           17.    A method of storing data in a storage device, comprising:  
2                   forming dents in at least some of storage cells formed in a storage medium;  
3                   electrically contacting a first portion of a tip of a probe to a surface of the  
4 storage medium in response to the tip being engaged at a first storage cell, the first storage  
5 cell having a dent; and  
6                   electrically isolating the first portion of the tip from the surface of the storage  
7 medium in response to the tip being engaged at a second storage cell, the second storage cell  
8 not having a dent.

1           18.    The method of claim 17, wherein forming the dents comprises heating  
2 respective regions of the storage medium corresponding to the storage cells to melt the  
3 respective regions to enable the tip of the probe to imprint the dents in the melted regions.

1           19.    The method of claim 17, further comprising moving the storage medium with  
2 respect to the probe to enable the probe to form the dents in the at least some of the storage  
3 cells during a write operation.

1           20.    The method of claim 19, further comprising moving the storage medium with  
2 respect to the probe to enable the probe to detect for storage states of respective storage cells  
3 during a read operation.